NAVSHIPS 0967-427-4020

VOLUME II

TECHNICAL MANUAL

OPERATION INSTRUCTIONS

RADIO RECEIVER R-1051B/URR

PN 2058947—0501

Bendix Communications Division
N00039-65-C-0117

Each transmittal of this document outside of the Department of Defense must have approval of the issuing Service.

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TABLE OF CONTENTS

Para		Page
LIST OF ILLUSTRATIONS		i
LIST OF TABLES		i
	SECTION 2. OPERATION	
2-1	Functional Operation	2-1
2-3	Operating Procedures	2-1
2-4	Description of Controls and Indicators	2-1
2-5	Sequence of Operation	2-1
2-6	Operating Modes	2-1
2-7	Shutdown	2-8
2-8	Operator's Maintenance	2-8
2-9	Operating Checks and Adjustments	2-8
2-10	Periodic Maintenance	2-9
2-11	Emergency Maintenance	2-9
ALPHABETICAL INDEX		Index 1

LIST OF ILLUSTRATIONS

Number	Title	Page
2-1	Radio Receiver R-1051B/URR, Operating Controls, Indicators, and Connectors	2-2
2-2	Radio Receiver R-1051B/URR, Internal Controls and Indicators	2-3
2-3	Radio Receiver R-1051B/URR, Rear Panel Connectors	2-4

LIST OF TABLES

Number	Title	Page
2-1	Radio Receiver R-1051B/URR, Operating Controls, Indicators, and Connectors	2-5

SECTION 2
OPERATION

2-1. FUNCTIONAL OPERATION.

2-2. Radio Receiver R-1051B/URR (hereafter also referred to as the R-1051B/URR or receiver) is designed to receive upper sideband (USB), lower sideband (LSB), independent sideband (ISB), continuous wave (CW), tone modulated CW (MCW), compatible and standard amplitude modulated (AM), and frequency shift keyed (FSK) transmissions in the 2- to 30-MHz frequency range. The R-1051B/URR contains a power supply, and may be operated as an individual unit or as part of a system, such as Radio Set AN/WRC-1B.

2-3. OPERATING PROCEDURES.

2-4. DESCRIPTION OF CONTROLS AND INDICATORS. All controls, indicators, and connectors required for normal use are shown in figures 2-1, 2-2, and 2-3, and are listed in table 2-1. The listing in table 2-1 is in order in a clockwise direction as shown on figure 2-1.

2-5. SEQUENCE OF OPERATION. To operate the R-1051B/URR, proceed as follows, using figures 2-1 and 2-2 as a guide:

a. Loosen front-panel screws and slide chassis out fully on slides.

b. Ensure that AUX/NORM power switch A2S7 is in AUX position and that SIMPLEX/DUPLEX switch A2S9 is in DUPLEX position.

c. Release slide locks, slide chassis back into case, and secure panel screws.

d. Set Mode Selector switch to STD BY. Set this switch prior to operation to allow frequency standard to come up to temperature. Allow a 20-minute warm-up for general operation and at least a 60-minute warm-up for optimum frequency stability. This switch is normally left in the STD BY position when not in use.

e. Set Mode Selector switch to desired mode of operation.

f. Using MCS controls, KCS controls, and CPS switch or CPS vernier control, select desired operating frequency as described in paragraph 2-6 for the selected mode of operation. The frequency selected will be displayed in small windows above MCS and KCS controls, and by CPS switch knob.

NOTE

When receiving signals not transmitted at 100-Hz increments, use CPS vernier control with CPS switch in V position. Do not use the V position unless absolutely necessary, since stability of the R-1051B/URR is reduced.

g. Depending on mode of operation selected, connect headset to USB PHONES jack or LSB PHONES jack on front panel.

h. Set LSB and USB LINE LEVEL switches to +20DB.

i. Adjust appropriate LSB or USB LINE LEVEL control for 0 dB, or as required initially for tuning purposes.

j. Adjust USB or LSB PHONE LEVEL control for desired headphone volume.

2-6. OPERATING MODES. Each of the following steps provides control settings for a particular mode of receiver operation:

a. CW Operation.

(1) Set Mode Selector switch to CW.

(2) Set frequency controls to assigned frequency.

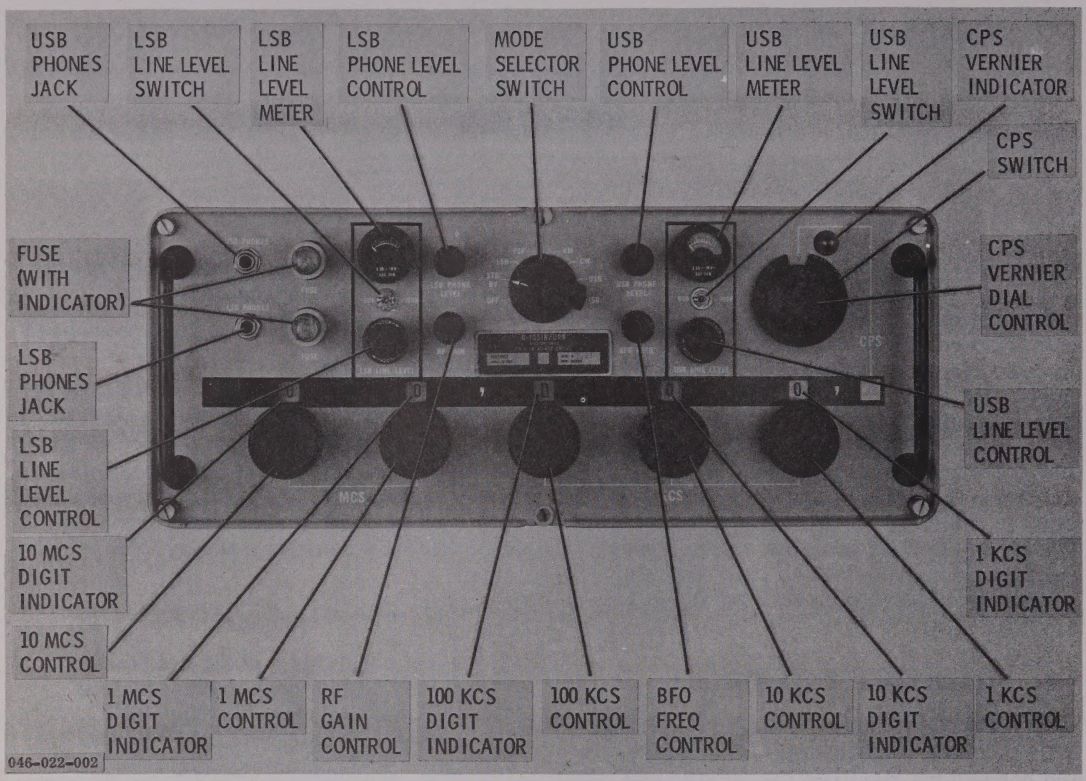

Figure 2-1. Radio Receiver R-1051B/URR, Operating Controls, Indicators, and Connectors.

(3) Adjust BFO FREQ control for desired pitch of received signal.

(4) If reception is unsatisfactory due to adjacent channel interference, sharper bandwidth is obtained as follows:

(a) Set Mode Selector switch to USB.

(b) Set frequency controls 1 kHz below assigned frequency.

(c) Set CPS switch to V.

(d) Adjust CPS vernier control for desired pitch of received signal.

(5) If reception remains unsatisfactory:

(a) Set Mode Selector switch to LSB.

(b) Set frequency controls 1 kHz above assigned frequency.

(c) Set CPS switch to V.

(d) Adjust CPS vernier control for desired pitch of received signal.

b. AM Operation.

(1) Set Mode Selector switch to AM.

(2) Set frequency controls to assigned frequency.

c. Single Channel Radio Teletype Operation. When using an AN/URA-8B, AN/URA-17, or other converter requiring a 2550-Hz center frequency, proceed as follows:

(1) Set Mode Selector switch to either FSK or USB.

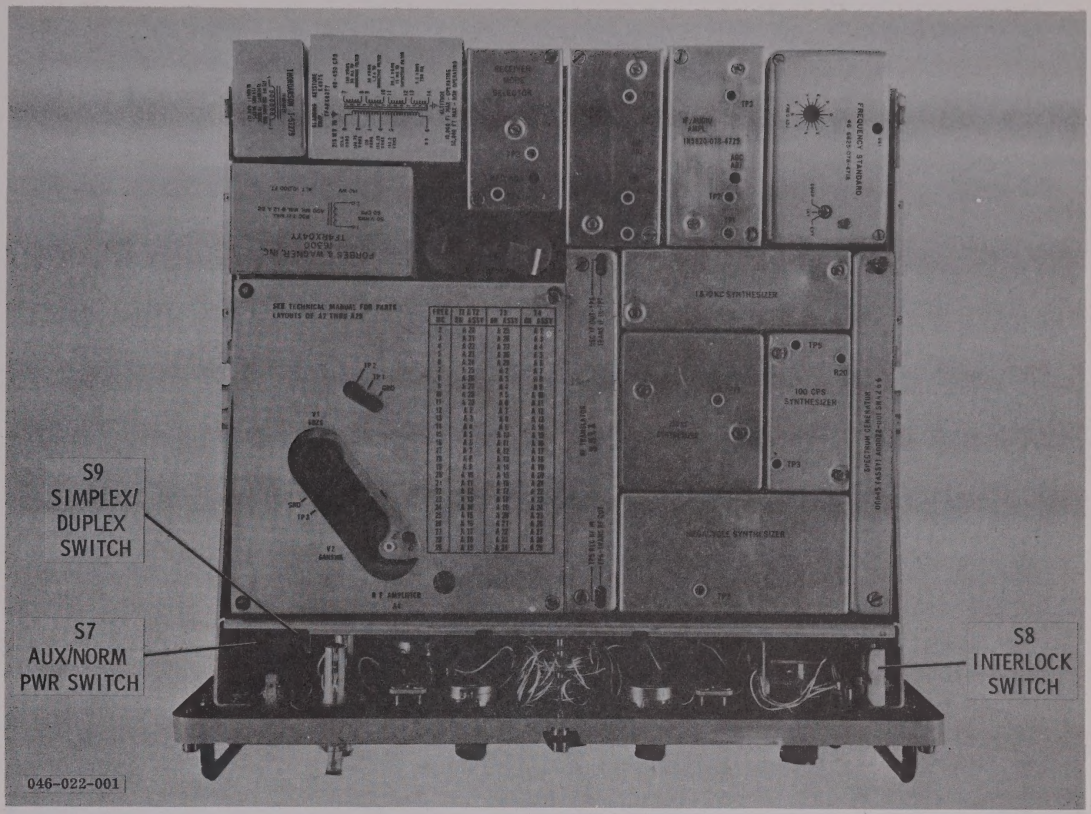

Figure 2-2. Radio Receiver R-1051B/URR, Top View, Case Removed

(2) Set frequency controls 2.5 kHz below assigned frequency. The 2.5-kHz setting will usually provide satisfactory copy.

(3) If copy is not satisfactory, set frequency controls 3 kHz below assigned frequency.

(4) Set CPS switch to V.

(5) Adjust CPS vernier control for proper pattern on tuning indicator of teletype converter.

d. When using a converter requiring a 2000-Hz center frequency, proceed as follows:

(1) Set frequency controls 2 kHz below assigned frequency if in USB mode, or 2 kHz above assigned frequency if in LSB mode.

(2) If adjacent channel interference becomes acute using the procedure above, set Mode Selector switch to LSB, and set frequency controls 2.0 or 2.5 kHz above assigned frequency.

(3) Set CPS switch to V.

(4) Adjust CPS vernier control for proper pattern on tuning indicator of teletype converter.

(5) Adjust normal-reverse switch of converter as required to obtain good copy.

e. Single Channel Facsimile USB. Set Mode Selector switch to USB. Set frequency controls 2.7 kHz below assigned frequency.

f. Single Channel Facsimile LSB. Set Mode Selector switch to LSB. Set frequency controls 2.7 kHz above assigned frequency.

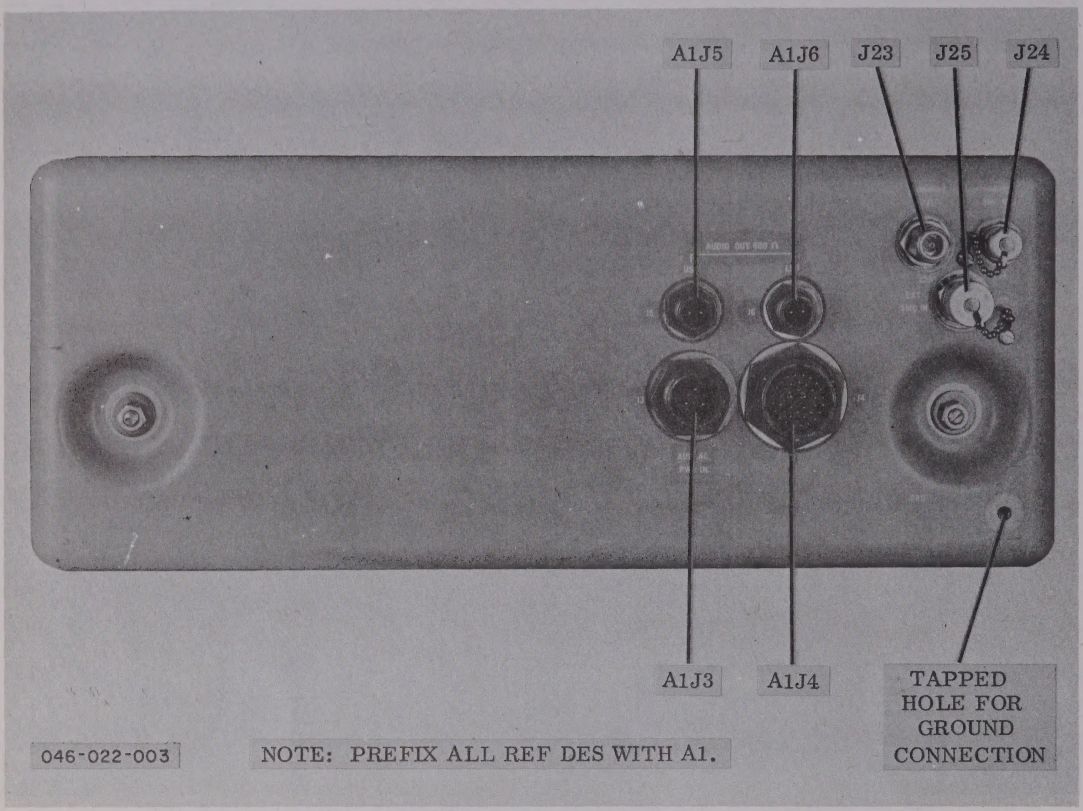

Figure 2-3. Radio Receiver R-1051B/URR, Rear View, Connectors

g. Composite Signal FSK and FAX in USB (for FAX). Set Mode Selector switch to USB. Set frequency controls 3.1 kHz below assigned frequency.

h. Composite Signal FSK and FAX in USB (for FSK) with Converter Requiring a 2550-Hz Center Frequency. Set Mode Selector switch at USB. Set frequency controls 1.5 kHz below assigned frequency. If copy is not satisfactory:

(1) Set CPS switch to V.

(2) Adjust CPS vernier control for proper pattern on tuning indicator of converter.

i. Composite Signal FSK and Facsimile in USB (for FSK) with Converter Requiring a 2000-Hz Center Frequency. Set Mode Selector switch at USB. Set frequency controls 1 kHz below assigned frequency. If copy is not satisfactory:

(1) Set CPS switch to V.

(2) Adjust vernier control for proper pattern on tuning indicator of converter.

j. USB Voice Operation. Set Mode Selector switch to USB. Set dial 1.5 kHz below assigned frequency.

k. LSB Voice Operation. Set Mode Selector switch to LSB. Set dial 1.5 kHz above assigned frequency.

l. USB Multiplex. Set Mode Selector switch to USB. Set dial 1.5 kHz below assigned frequency.

TABLE 2-1. RADIO RECEIVER R-1051B/URR, OPERATING CONTROLS, INDICATORS, AND CONNECTORS

CONTROL/INDICATOR CONNECTOR	REFERENCE DESIGNATION	FUNCTION
	Shown on Figure 2-1.	
USB PHONES jack	A2J2	Used to connect headset to LSB receiver output.
LSB LINE LEVEL switch	A2S1	Provides low (0DB) and high (+20DB) level scales on LSB LINE LEVEL meter.
LSB LINE LEVEL meter	A2M1	Indicates level of audio supplied to LSB line.
LSB PHONE LEVEL control	A2R4	Used to adjust volume of audio applied to headphone in LSB and ISB (LSB) operation.
Mode Selector switch	A2S2	Selects R-1051B/URR modes of operation. Switch Position — Equipment Response OFF — No power is applied. STD BY — Energizes frequency standard and tube filaments. LSB — R-1051B/URR operates in lower sideband mode. FSK — R-1051B/URR operates in frequency shift keyed mode with audio output on USB. AM — R-1051B/URR operates in amplitude modulated mode with audio output on USB. CW — R-1051B/URR operates in continuous wave mode with audio output on USB. USB — R-1051B/URR operates in upper sideband mode. ISB — R-1051B/URR operates in independent sideband mode with audio output on LSB and USB.
USB PHONE LEVEL	A2R5	Used to adjust volume of audio applied to headset in USB, ISB (USB), FSK, CW, and AM operation.

TABLE 2-1. RADIO RECEIVER R-1051B/URR, OPERATING CONTROLS, INDICATORS, AND CONNECTORS (Cont)

CONTROL/INDICATOR CONNECTOR	REFERENCE DESIGNATION	FUNCTION
	Shown on Figure 2-1 (Cont)	
USB LINE LEVEL meter	A2M2	Indicates level of audio supplied to USB line.
USB LINE LEVEL switch	A2S5	Provides low (0DB) and high (+20DB) level scales on USB LINE LEVEL meter.
CPS vernier indicator	A2DS5	Indicator flashes to indicate that CPS switch is in V position and frequency stability is not as great as in other positions.
CPS switch	A2A11S6	When CPS switch is set at 000, the R-1051B/URR operates at frequency selected with MCS and KCS controls. Operating frequency can be increased in 100-Hz steps above that selected by MCS and KCS controls by rotating CPS switch in clockwise direction from 000 position to 900 position. With CPS switch at V position, the CPS vernier control may be used to vary operating frequency from below third KCS digit frequency to above third KCS digit frequency.
CPS vernier control	A2A11R7	Provides continuous tuning between 1-kHz increments when CPS switch is set to V position.
USB LINE LEVEL control	A2R2	Used to adjust volume of remote audio for USB, ISB(USB), FSK, CW, and AM operation.
1 KCS control		Selects 1-kHz digit of desired operating frequency; digit selected will be displayed in window above control.
10 KCS control		Selects 10-kHz digit of desired operating frequency; digit selected will be displayed in window above control.
BFO FREQ control	A2R6	Used to adjust pitch ±3 kHz of audio output tone when receiving CW.
100 KCS control		Selects 100-kHz digit of desired operating frequency; digit selected will be displayed in window above control.

TABLE 2-1. RADIO RECEIVER R-1051B/URR, OPERATING CONTROLS, INDICATORS, AND CONNECTORS (Cont)

CONTROL/INDICATOR CONNECTOR	REFERENCE DESIGNATION	FUNCTION
	Shown on Figure 2-1. (Cont)	
RF GAIN control	A2R3	Used to control gain of rf and if. amplifiers.
1 MCS control		Selects 1-MHz digit of desired operating frequency; digit selected will be displayed in window above control.
10 MCS control		Selects 10-MHz digit of desired operating frequency; digit selected will be displayed in window above control.
LSB LINE LEVEL control	A2R1	Used to adjust volume of remote audio for LSB and ISB (LSB) operation.
LSB PHONES jack	A2J1	Used to connect headset to LSB receiver output.
FUSE (with indicator)	A2F1, F2	Protect R-1051B/URR against overload; indicators glow when fuse is open.
	Shown on Figure 2-2.	
AUX/NORM PWR switch	A2S7	Selects 115-Vac input from either J3 (AUX-independent receiver power input) or J4 (NORM-dependent on AN/WRC-1B for power input).
Interlock switch	A2S8	Deenergizes the R-1051B/URR chassis when withdrawn from case.
	WARNING 115 Vac is present on input connector and wiring of the R-1051B/URR when interlock switch S8 is open. Use due care to avoid electrical shock.	
SIMPLEX/DUPLEX switch	A2S9	Provides for simplex or duplex operation when connected into AN/WRC-1B system. (Normally left in DUPLEX position.)
	Shown on Figure 2-3.	
AUDIO OUT 600Ω USB connector	A1A1J5	Used to connect USB audio to receiver switchboard when not used in AN/WRC-1B system.

TABLE 2-1. RADIO RECEIVER R-1051B/URR, OPERATING CONTROLS, INDICATORS, AND CONNECTORS (Cont)

CONTROL/INDICATOR CONNECTOR	REFERENCE DESIGNATION	FUNCTION
Shown on Figure 2-3. (Cont)		
AUDIO OUT 600Ω LSB connector	A1A1J6	Used to connect LSB audio to receiver switchboard when not used in AN/WRC-1B system.
ANT 50Ω connector	A1J23	Used to connect antenna to receiver.
INT 5MC OUT connector	A1J24	Used to connect receiver internal standard to other equipment.
EXT 5MC connector	A1J25	Used to connect external frequency standard.
System control connector	A1A1J4	Used to connect receiver to J-1265/U interconnecting box in AN/WRC-1B system.
AUX AC POWER IN connector	A1A1J3	Used to connect 115 Vac, 48 to 450 Hz, to receiver when not used in AN/WRC-1B system.

m. LSB Multiplex. Set Mode Selector switch to LSB. Set dial 1.5 kHz above assigned frequency.

n. ISB. Set Mode Selector switch at ISB. Set frequency controls to assigned frequency. This setting is for any combination of ISB (i.e., MUX/VOICE, VOICE/VOICE, MUX/MUX, etc.).

2-7. SHUTDOWN. During short periods of shutdown, set the Mode Selector switch to STD BY. This eliminates the need for frequency standard warmup prior to resuming normal operation. To shut down the R-1051B/URR completely, set the Mode Selector switch to OFF.

2-8. OPERATOR'S MAINTENANCE.

2-9. OPERATING CHECKS AND ADJUSTMENTS. When the R-1051B/URR is suspected of malfunction, perform the following receiver operation check to aid in locating the trouble:

a. Set Mode Selector switch to CW.

b. Set RF GAIN control fully clockwise.

c. Set CPS switch to 000.

d. Tune the R-1051B/URR to WWV or WWVH at 5, 10, or 15 MHz.

e. Plug headset in USB PHONES jack.

f. Adjust USB LINE LEVEL control and USB PHONE LEVEL control for comfortable signal level.

g. Check that signal is received and signal tone varies when BFO FREQ control is varied.

h. Set Mode Selector switch to USB. Tune the R-1051B/URR 1 kHz lower than WWV carrier, and check that signal is heard in headset.

i. Set Mode Selector switch to LSB. Tune receiver 1 kHz higher than WWV carrier. Plug headset in LSB PHONES jack. Set LSB LINE LEVEL control and LSB

PHONE LEVEL control for comfortable signal level. Check that signal is heard in headset. Rotate CPS switch to V and check that signal tone varies as CPS vernier control is rotated.

j. Set Mode Selector switch to AM. Plug headset in USB PHONES jack. Tune the R-1051B/URR to a known AM station such as Armed Forces frequency at 15.330 MHz. Check that signal is heard in headset.

k. Set LSB and USB LINE LEVEL controls for required output on LSB and USB LINE LEVEL meters.

2-10. PERIODIC MAINTENANCE. The periodic maintenance procedures that should be performed by the operator are listed in Maintenance Standards Book, NAVSHIPS 0967-427-4030. If the Electronics Planned Maintenance System (PMS) is implemented, refer to the Maintenance Requirement Cards.

2-11. EMERGENCY MAINTENANCE. If the R-1051B/URR malfunctions, the operator should perform the following emergency repair procedures:

a. Try another mode of operation.

b. Perform steps a. through j. of paragraph 2-9.

c. Check for any damaged cables.

d. Loosen front-panel screws and pull chassis from case. Perform the following checks:

(1) Check all electronic assemblies for proper seating.

(2) Check electron tubes to see that filaments are lighted. If tubes in RF Amplifier Electronic Assembly A2A4 should be replaced, remove tube shield and pull tube out with tube puller, using steady pressure straight up.

ALPHABETICAL INDEX

Subject	Paragraph, Figure, Table Number
A	
AM, Operation	2-6b
C	
Checks and Adjustments, Operating	2-9
Composite FSK/FAX Operation	2-6g, h, i
Connectors, Rear View	F 2-3
Controls and Indicators, Description	2-4
Controls, Indicators, and Connectors, Operating	T 2-1
CW Operation	2-6a
E	
Emergency Maintenance	2-11
F	
Facsimile, Single-Channel Operation	2-6e, f
FSK/FAX, Composite Operation	2-6g, h
Functional Operation	2-1
I	
ISB Operation	2-6
M	
Maintenance:	
Emergency	2-11
Operator's	2-9
Periodic	2-10
Multiplex Operation	2-6l, m
O	
Operating:	
Checks and Adjustments	2-9
Controls, Indicators, and Connectors	T 2-1
Modes	2-6
AM	2-6b
CW	2-6a

ALPHABETICAL INDEX (Cont)

Subject	Paragraph, Figure, Table Number
O (Cont)	
Composite FSK/FAX	2-6g, h, i
Facsimile, Single-Channel	2-6e, f
ISB	2-6n
Multiplex	2-6l, m
RATT, Single-Channel	2-6c, d
Voice	2-6j, k
Procedures	2-3
Operation, Sequence	2-5
Operator's Maintenance	2-8
P	
Periodic Maintenance	2-10
R	
Radio Receiver R-1051B/URR:	
Operating Controls, Indicators, and Connectors	F 2-1
Rear View, Connectors	F 2-3
Top View, Case Removed	F 2-2
RATT, Single-Channel Operation	2-6c
S	
Shutdown, Operation	2-7
V	
Voice Operation	2-6j, k

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